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SOIL EROSION CONTROL



## OUR FIRST YEAR

As the first year of our work comes to a close, we are reminded to stop and look back on our accomplishments for the year. There is always a tendency to take credit for things worthwhile. In this connection the Soil Erosion Service and the cooperating farmers can look with pride on the fine piece of work that their mutual efforts have accomplished.

This, the anniversary number of the Farm Cooperator, is made up largely of reports of the progress of the various technical phases of the Service. Each technical division has made its contribution to the general coordinated program, working with each other division as a united whole.

### PROGRESS IN AGRONOMY

A year ago very little alfalfa was being grown within the project area. At the present time, over 400 farmers are starting this valuable crop. From the observations that have been made of the alfalfa sown last fall, cooperating farmers should be very much encouraged. The attention of the public is called to the fine alfalfa on the farms of J. Holswade, Charley Smith and John Simmons.

Strip-cropping has been started, and while there is still a long way to go in this work, a beginning has been made. Strip-cropping is one of the methods used by the better farmers to aid in the preservation of their soil. In order to make the strip-cropping as effective as possible, rotations of the strips have been worked out. Proper crop rotation insures higher yields as well as aiding in holding the valuable topsoil. Crop rotations have been worked out for almost 7,000 acres, covering all land used for hay and cultivated crops.

According to a land use survey, 64% of the area is being used for pasture. Large areas of pasture land have been improved with lime and super-phosphate, which should easily tripple the production of the area treated, thereby forming a sod capable of holding soil losses to a minimum. Pasture Management plans have been worked out covering thousands of acres of pasture land. Pasture surveys have been inaugurated with the idea of learning more about the grazing condition in the area. These surveys will aid in the making of more accurate recommendations for pasture management.

Erosion resisting plants, such as the lespedeza and Kudzu, have been introduced into the area. Lespedeza seed will be sown over an area of approximately 2,000 acres. It is felt that this will not only be a valuable crop for pasture, but will be worth while from a hay production standpoint. Kudzu is a new crop, but from observations made of the few plants already growing on the farm of Mr. Tom Ryan, just south of Spencer, it is felt that it will have merit, both as an erosion resisting plant and as a forage crop.

Cooperating farmers, in carrying out this program, have used about 12,000 tons of lime, 1,100 tons of fertilizer and the necessary grass and grain seeds.



## THE SOILS DIVISION TAKES PART IN SOIL EROSION CONTROL

In order that a sound policy of soil conservation and land utilization may be maintained, it is essential that full knowledge of the soil and erosion conditions be obtained. The Soils Division is charged with the responsibility for making this inventory of the natural soil resources of all farms as a basis on which to plan the erosion control programs. The maps, provided by the experienced soils men, supply the foundation upon which effective land use and erosion control programs can be developed. On the maps are outlined the soil types, the kind and quality of cover, the percentage of slope, and the degree of erosion.

Thirteen different soil series embracing nineteen different soil types have been mapped in the Ready Creek Soil Erosion Control Project. Many more series and types are found throughout West Virginia. Each presents a different problem, and all concerned with a land use and erosion control program should study carefully the soils to be used for cultivated crops, for pasture, and for reforestation. Frequently land is poor because of the fact that much of the surface has eroded away due to improper soil management, or because it is being used for purposes to which it is not adapted.

The value of the soil erosion survey is apparent, then, as the adaptation of the soil to the crop is brought out by such a detailed study. It expedites the work of the Agronomist in planning cropping systems to conform to the soil types, slopes, and degrees of erosion. It points out to the Forester the areas suited to tree planting, but not adaptable to other purposes, and to the Engineer those areas which require structures adapted to the different soil and erosion conditions.

The Soils work did not start until late in August, 1934. Its first responsibility was to make a soil erosion reconnaissance survey of forty-five counties in West Virginia.

The reconnaissance survey brought to light the fact that the most widespread area devoted to cultivated crops and pasture comprises about twenty counties in the western and northwestern part of the state, within the drainage area of the Ohio River and following its general direction. It is significant that the greatest amount of destructive soil erosion has taken place in this region, due, in part, to the erosiveness of the soils, but mainly to the methods of farming employed. The practice, usually resorted to, of clearing the steep slopes, burning the land surface, and growing cultivated crops has led to the rapid loss of the surface soil during the time it was not covered by trees or grass.

The extreme southern end of the state comprises the area in which the coal mining industry exceeds farming many times. This is also a region of severe erosion conditions due, in part, to clearing the steep slopes, but mainly to the lumbering methods employed. The remaining part of the state has never been entirely cleared of timber, although the lumbering industry flourished there for sometime, but even here considerable soil erosion has taken place.





To date, approximately 65,000 acres of the 152,000 or more acres comprising the Reedy Creek Project area have been mapped in detail. The detailed erosion survey has brought to light the facts contained in the following tables:

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SLOPE DISTRIBUTION

Slope Class	Percent of Area	
	%	%
A	0-4	4.97
B	4-12	5.88
BB	12-25	17.98
C	25-40	40.68
D	40 or steeper	30.49

EROSION DISTRIBUTION

Erosion Class	Percent of Area
	%
1	4.69
2	8.89
3	62.72
4	19.68
5	4.02

Erosion class 1 includes bottoms, and other areas sometimes occurring in woods, which are apparently uneroded; class 2, where less than 25% of the surface soil has been removed; class 3, where 25% to 75% of the surface soil has been removed; class 4, where more than 75% of the surface soil and up to 25% of the soil has been removed; class 5, where all of the surface soil and more than 25% of the subsoil has been removed. These figures refer only to sheet erosion classes.

It will be noted that the percentage of the area in 1 and 2 erosion classes conforms rather closely to the percentages of gently sloping or level lands.

The tables given above are preliminary ones and subject to correction. They are based on facts brought out in the detail survey of about one-third of the area. The Soils Division plans to map the entire Reedy Creek Project area during the spring and summer.

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GRASS

"Grass is the forgiveness of nature--her constant benediction... Its tenacious fibers hold the earth in its place and prevent its soluble components from washing into the wasting sea. It invades the solitudes of the desert, climbs the inaccessible slopes and forbidden pinnacles of mountains, modifies climates, and determines the history, character and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare and the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes the throne from which it has been expelled, but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet, should its harvest fail for a single year, famine would depopulate the world."

-- John J. Ingalls.



## SUMMARY OF THE ENGINEERING ACTIVITIES OF THE SOIL EROSION SERVICE

The Engineering Division has during the past eight months been engaged primarily in gully control work with some effort directed toward stream control. One major and six minor stream problems were handled. Stream control costs are usually high and the results uncertain. In most of the problems investigated the final results would not justify the costs.

Gully control has been attempted through the erection of various types of dams, through diversion ditches, and by placing of brush matting. The E.C.W. Camps assigned to this project furnished the labor for construction. Since December 7th, when planting was terminated, some 2600 dams have been completed, about 64,000 square yards of bank sloping and protection; and approximately 11,500 lineal feet of diversion ditches. The area drained by the gullies on which work has been done approximates 2500 acres. It is interesting to note that the total farm acreage represented by the farms on which gully work has been completed is 17,090. This is about 11 $\frac{1}{2}$  percent of the total farm area.

Seeding of gully structures has been completed on 14 farms. The spring seeding program is just starting and will continue until about the end of April.

From a study carried on in conjunction with the regular gully control survey, the following tabulation relative to the probable causes of erosion of the various gullies surveyed have been compiled:

Livestock	22%	Overgrazing	15 $\frac{1}{2}$ %
Slips	17%	Old Haul Roads	14.8%

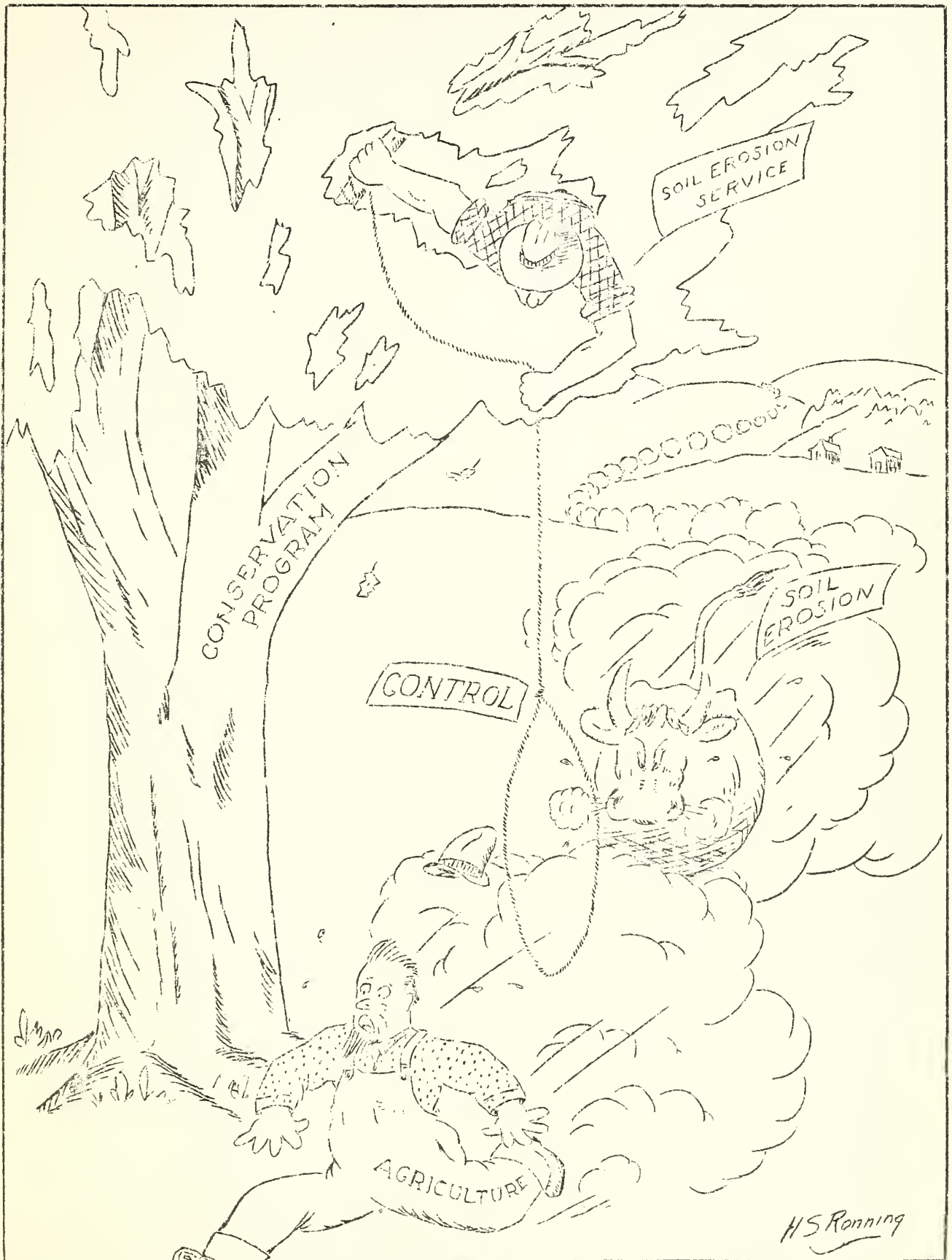
During the months of July, August, and September, the Engineering Division placed about 1600 feet of drain tile varying from 4" to 15" in diameters. It also assisted the Forestry Division in the design and erection of a storage depot on the forest nursery near Reedy; a garage, oil house and tool shed at the Elizabeth camp; and a tool shed at the Veterans' camp near Billings. A 2,000 foot road has been placed through the nursery as well as a rock approach for the storage depot. Leveling work necessary to put the nursery in shape for planting together with stream widening and fill required for the building site has necessitated the moving of around 15,000 cubic yards of earth.

In addition to its regular work, the Engineering and Drafting Division has completed the plans for a storage depot, a tool shed, an oil house, a garage, a lime spreader, and a recommended system of improvements for springs. A total of twelve talks on erosion control structures have been given at farmers' meetings held in different sections of the area.

The accomplishments of the Engineering Division have been made possible only through the whole-hearted cooperation and effort of the other divisions of the Soil Erosion Service, the ECW Camps, and the many farmers cooperating in our program of erosion control.



WE'RE HERE TO HELP!!







## FORESTRY PROGRESS ON THE PROJECT

The past year has marked the beginning of a new conception of agriculture development and land use. Foremost in this field has been the work of the Soil Erosion Service with its coordinated program of conservation. The Soil Erosion Service in this area has been in operation one year and a brief review of the activities along forestry lines should be of interest to farmers and townspeople alike.

It has long been recognized that forestry is a component part of any land use program but only recently has it been regarded as such by the rank and file of our agricultural population.

The forest in its true conception is a crop that can be planted, protected and harvested at a profit to the owner. It requires no cultivation and only a minimum of protection during the period of growth. Probably no other crop will yield comparable returns on the same soil with the same amount of attention as does the woodlot.

Working with this thought in mind, the Soil Erosion Service has been able to make a start in the right direction. The cooperators and farmers throughout the area have begun to realize the value of woodlots for the purpose of erosion control and as a permanent farm asset.

During the past year the service has started a forestry program which includes:

1. Reforestation of 1902.5 acres.
2. Development of the Reedy Forest Nursery.
3. Establishment of three demonstrational woodlots.
4. The construction of 18,641 rods of fence.
5. The collection of 12,735 bu. of black walnuts.
6. Locating and developing markets for wood products.
7. Preliminary plans for the purchase and development of three sub-marginal areas in cooperation with the A.A.A.
8. A Forest Survey covering 152,000 acres.
9. Participation in preparation of exhibits for the Forest Festival and Farm and Home Week.
10. The management of two ECW camps.
11. Speaking engagements with farmers, business men, and clubs, on forestry and erosion control.

The reforestation work has been limited due to the shortage of suitable planting stock. Species have been limited to black locust, black walnut, yellow poplar, and osage orange. The establishment of the Reedy Forest nursery will make available more planting stock and will give a wider variety of species from which to choose.

The construction of fence was necessary in order to protect the young trees from grazing damages and to insure better farm management.





The reception of the work already started encourages the service to greater efforts, as it enters the second year. It is hoped that a larger tree planting program, increased woodlot improvement work, fish and game development, fire prevention, and a well rounded program of land use can be carried out.

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## PLANTING FOREST TREES SUCCESSFULLY

Planting trees is really quite simple and it is necessary to observe only a few basic principles to secure satisfactory results. The best season for planting in this section is the period between March 15th and May 1st. Fall plantings can be made during the period of October 15th to December 1st, but considerable damage will result from frost heaving. The best tool to be used is the ordinary mattock or grub hoe, and the many special planting tools on the market have few, if any, advantages for general planting work.

The essential steps in planting are:

1. Remove the sod or ground cover from an area approximately one foot square.
2. Opening up a hold sufficiently large to accommodate all of the roots without crowding.
3. Place the seedling tree in the hole in a natural position with the root well spread.
4. Place a few handfuls of pulverized top soil around the roots and pack firmly.
5. Fill in the remaining soil, being careful to remove all litter and trash.
6. Pack soil firmly around the seedling tree and test to see if it set firmly by gently pulling up on it.
7. Collect one or two handfuls of leaves or grass and scatter over the exposed soil around the base of the seedling.

On barren or badly exposed areas it is often necessary to secure a few handfuls of good top soil to place in the bottom of the hole before planting. Trees, like all other plants, respond to limited amounts of fertilizer but its use is not recommended in making ordinary forest plantings.

Some important don'ts are:

- Don't expose the roots of any seedling tree to the drying action of the wind and sun.
- Don't crowd the roots into a small hole.
- Don't place grass, sod, manure, or trash next to the naked roots.
- Don't pile the dirt around the seedling.
- Don't plant the seedling tree with any roots exposed.
- Don't plant the seedling tree more than one inch deeper than it was originally.
- Don't prune the roots unless they are extremely long.
- Don't fail to protect the seedling trees from tramping, grazing and fire after they are planted.

Careful following of the above methods will enable land owners to successfully establish forest plantations.



## PROGRESS REPORT

### Erosion Specialist Division

The Erosion Specialist Division, composed of the contact men, has placed under contract 35.25 percent of the total area in the Reedy Creek Soil Erosion Project during the past year. Of the 152,000 acres in the project, invitation cards have been received for 101,500 acres, and 53,591 acres have been contracted. The above acreage represents 409 farms out of a possible 1,201. The latter figure includes all farms regardless of whether or not invitation cards have been received.

The Land Utilization program worked out on each farm includes a number of things which are, perhaps, entirely new to farmers in this section. In other words, the program of controlling soil erosion means more than the application of lime and fertilizer to a few acres. Of course, less farms could have been taken and materials issued to treat the entire farm, but it would seem that smaller demonstrations on a larger area would be much more effective. Briefly then, let us consider the major points employed in working out the land program.

First of all, and the most important from the farmers standpoint, is the crop land. This represents only about 10 - 15 percent of the land in the area. Since the erosion problem on this land is negligible, the Soil Erosion Service has applied no treatment. The problem here is increased production or intensified production, and definite rotations have been established looking toward the maintenance of soil fertility and therefore, the best land use practices. Not only this, but plowing should be confined to the bottom land and the slopes left for pasture or trees. It is said that when a hillside is plowed, erosion removes many times the plant food that is removed by the crop itself. But, in any case, the value of a good rotation is seen in many ways. Definite rotations have been worked out on 6,421 acres.

Another feature that is not being practiced is strip-cropping or farming the land in strips. This is practical on land that slopes up to 20 percent. In many cases, there is no bottom land present, therefore, it becomes necessary to farm the slopes. The best way to do this, in order to prevent excess run-off, is to lay off the fields in strips, following the natural contours, and work out a rotation in such a way that adjoining strips will not be plowed together. Cooperators have agreed to strip-crop 847 acres.

Second, it is necessary to have more intensive meadows. The Soil Erosion Service has attempted to make all hill meadows permanent by treating with lime and fertilizer; by planting to trees; or by retiring to pasture. In all cases, the idea of erosion control and land utilization has been uppermost. When it becomes necessary to plow hillmeadows for re-seeding, they should be immediately seeded down to grass with a small grain companion crop.



Progress Report - Erosion Specialist Division  
continued

Approximately 5,000 acres of pasture land have been limed and fertilized and this has been on slopes ranging from 12 to 30 percent. Also, 2,197 acres of meadow land have been retired to pasture. In any case, the application of treatment and seed is intended to increase the vegetative covering. Add to this proper pasture management and the result will be very significant.

Fourth, due to the steepness of the land, it is believed that trees will play a very great part in preventing erosion. These have been placed on the steeper slopes, sometimes in strips, and sometimes solid, but to date 4,000 acres have been contracted to go to trees. In addition, considerable areas already in woods have been fenced and protected from fire and grazing because even in woods, erosion may become very active.

A typical farm for the area then will contain around 100 acres. Probably 50 to 60 acres of this should be in pasture with eight acres receiving treatment; 12 acres will be in meadow with three to four acres treated; 10 to 20 acres will be in woods and new trees; the remainder will represent the acres to be cultivated. This, in the main, represents the proper land use as it is being worked out.

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This gives a brief summary of the work attempted by the Soil Erosion Service during the past year. It has been an enormous undertaking and results are only beginning to show, but it will certainly be a splendid demonstration, both in checking the flow of water and making for permanency in agriculture.

Perhaps the greatest accomplishment of the Service is that it has aroused the farmers and the public in general to the ravages of erosion. This has brought about a determined effort to control the worst enemy of the soil -- EROSION.

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Farmers are learning from experienced erosion specialists the most efficient and practical methods of saving their land from the ravages of wind and rain.

More than the salvation of the land,--in itself an epic achievement,--halting Erosion means the salvation of the reservoirs and river channels which are so rapidly clogging up with silt. It means a minimizing of the ever-present menace of floods. It means the rising of the water-table in those vast arid areas where the rain that falls so seldom does not sink into the thirsty ground but runs off into streams and rivers as so much waste.

---H. H. Bennett, Director,  
Soil Erosion Service.





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